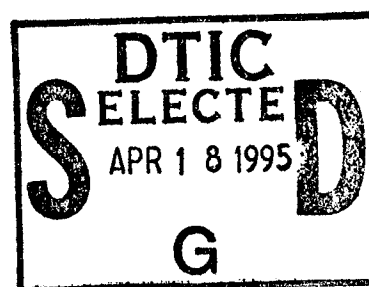


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The Submarine Threat to Naval Operations . . . From the Sea

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**Abstract of**  
*The Submarine Threat to Naval Operations . . . From the Sea*

As the U.S. Navy focuses on future participation in joint operations in the littoral environment, operational planners must carefully assess the risk posed by a capable regional submarine force. Third World submarine force capabilities are improving significantly as new submarine technology and advanced weapons systems are incorporated. The potential impact that a future adversary's submarine operations could have on currently envisioned naval operations must be carefully evaluated.

The virtually unknown operations of the Argentinean *Type-209* diesel-electric submarine ARA *San Luis* during the Falkland Islands War highlights the significance of a littoral submarine threat to naval operations. The *San Luis* conducted two torpedo attacks on British warships that were apparently unsuccessful due to a technical problem. Nevertheless, the fact that the attacks were made, despite intense British anti-submarine warfare efforts, underscores the challenges of countering a shallow water submarine threat.

In preparing to counter a potential littoral submarine threat, the U.S. Navy should: 1) closely monitor and evaluate Third World submarine proliferation issues and current capabilities, 2) emphasize shallow water ASW tactical development and training, 3) develop technologies to exploit the shallow water environment, and 4) be prepared to incorporate an effective ASW strategy into future littoral operations.

## Introduction

Haven't we heard enough about the Third World submarine threat and shallow water anti-submarine warfare? The answer quite simply is -- no. From an operational perspective the issues are much more complex than dutifully "bean counting" hulls and studying shallow water oceanography. The real crux of the issue is the potential impact that a regional submarine threat could have on future naval operations.

## A Lesson Worth Remembering

*An appreciation for the virtually unknown operations of one Argentinean submarine during the Falkland Islands War highlights the challenges posed by the littoral submarine threat of tomorrow.*

2000L, 15 June 1982 . . . Captain Fernando Maria Azcueta eased back in his stateroom armchair sipping a cup of hot coffee aboard the ARA *San Luis*, one of two German designed Type-209 diesel-electric submarines in the Argentinean Navy. As he relaxed, he reflected with pride on the performance of his relatively inexperienced crew during the preceding weeks of intense and highly dangerous operations against arguably one of the most capable anti-submarine warfare (ASW) navies in the world.

He had hastily sailed the *San Luis* from her homeport of Mar del Plata on the 11th of April to support the defence of the Falkland Islands which his countrymen had seized from British control only days earlier. The "British Lion" had been stirred and it appeared that a diplomatic solution to the crisis was

improbable as a British battle group bore down on the islands.

Captain Azcueta reflected with a sense of frustration upon the failed attacks he had conducted against British warships during the recent combat patrol. If not for a frustrating technical problem, the *San Luis* could have possibly inflicted several lethal blows to the ships of the British battle group.

On the 1st of May his crew had acoustically classified a group of medium sized warships operating in the vicinity of the Falklands. As he maneuvered the *San Luis* to within 10,000 yards, he unleashed an SST-4 wire guided torpedo. With the submarine's fire control computer hard down, the crew had calculated a firing solution and guided the torpedo manually. He had been confident that he would be hearing the primary explosion of the torpedo as it penetrated the hull of a British warship approximately six and a half minutes after the launch. Three minutes into the torpedo's run, his Weapons Control Coordinator slammed his fist on the console and in a frustrated voice informed him that the torpedo's guidance wire had severed rendering it harmless. The British counter-attack that followed proved to be the most psychologically demanding period of operations he had yet to experience. Nevertheless, his crew performed admirably and after twenty unnerving hours, the relentless sound of the hunting warships' screws, helicopters, and exploding depth charges faded in his sonarman's headset.<sup>1</sup>

Ten days later, in the vicinity of the Strait of San Carlos, he had a second chance at striking the Royal Navy. Having

identified two British frigates sailing north of the strait, he positioned the *San Luis* in front of, and between, the approaching combatants. From 5,000 yards he fired an SST-4 hoping that the wire guidance system would not fail as in the previous engagement. Hope was not enough, and once again the guiding wire snapped as the torpedo homed in on the unsuspecting frigate. Due to the high speed of the warships, he had been unable to position the *San Luis* for a second attempt. Luckily, it appeared his attack went undetected as no counter-attack followed. Having reported the repeated torpedo failures to Argentinean Navy headquarters, he was ordered to return to Mar del Plata.<sup>2</sup>

Now, four weeks later, with the torpedo guidance problems corrected, he had been anxious to sail again but the events of the previous day had resulted in the cancellation of his operational orders. Following the successful assault of Port Stanley, the British had quickly overpowered the Argentinean forces effectually bringing the armed conflict to a close.

Yes, Captain Azcueta thought, even though the *San Luis* would not get a second chance, his crew had proven themselves in combat -- clearly rising to the challenge. If not for the technical problem with the torpedo system, the attacks against the British battle group could possibly have altered at least the course of the conflict if not the final outcome. He was proud that he had successfully operated the *San Luis* more than 800 miles from its homeport, and even though his attacks were not fruitful, his efforts had nevertheless frustrated the British who expended more

than 200 ASW weapons during the conflict in an attempt to neutralize the elusive Argentinean submarine threat.<sup>3</sup>

Many naval experts have ignored the significance of the Argentinean submarine threat during the Falklands War and have even refuted Captain Azcueta's accounting. Nevertheless, the enormous amount of ASW ordinance expended by the British speaks for itself. What were British commanders attacking? . . . whales, schools of fish, the *San Luis*? The Royal Navy would later acknowledge the ASW challenge, but its significance was overshadowed by concern for the difficulties experienced in dealing with the air threat. The obvious lessons regarding the significance of a submarine threat to naval forces operating in a shallow water environment were largely lost on the U.S. "Cold War" Navy in 1982. The Navy's ASW forces had given primacy to mastering the ability to counter the open ocean submarine threat posed by the highly capable Soviet submarine fleet. Practically all ASW technological initiatives, tactics, and training were directed at countering the Soviet deep water submarine threat.

The unexpected end of the Cold War brought about a dramatic shift in focus for the Navy as revealed in 1992's *From the Sea*:

Our ability to command the seas in areas where we anticipate future operations allows us to resize our naval forces and to concentrate more on capabilities required in the complex operating environment of the "littoral" or coastlines of the earth.<sup>4</sup>

Immediately ASW specialists began focusing on the shallow water ASW challenge; however, the potential impact of a regional submarine threat on future littoral naval operations seems to

have recently been understated, possibly due to the lack of a submarine threat during Desert Storm.

Looking forward, if we are truly going to conduct operations as foreseen in . . . *From the Sea*, we will undoubtedly one day have to contend with operating our naval forces in a littoral environment where there is a submarine threat. Bearing that in mind, it is imperative that today's operational planners have a realistic appreciation for the magnitude of the littoral submarine threat, its operational impact, and what can effectively be done with today's resources to deal with it.

#### Cheap Submarines That Keep Getting Better and Better

Why should today's operational planners have such a healthy respect for the potential littoral ASW problem? I would suggest that the loss of a U.S. aircraft carrier, troop laden amphibious ship, or even a critical sea lift asset to a Third World submarine during a limited conflict could easily turn out to be an operational "show stopper." Such a loss could conceivably cripple force deployment efforts or deal a serious blow to domestic support that is crucial to maintaining political commitment to an operation.

Understanding the current capabilities of Third World submarine forces is of course crucial, but just as important are the issues of continued submarine proliferation and the impact of new technologies in submarine development. Today more than 44 countries operate capable submarine forces. Some of these



submarine forces are considered to have minimal operational capability due to excessive age, poor maintenance, or lack of quality training; however, a significant and growing number of countries successfully operate modern submarine forces that would pose challenging operational problems for planners having to contend with such a threat.

The issue of submarine and related weapons systems proliferation should be of great concern. The potential market for diesel-electric submarine sales has recently been valued at over 60 billion dollars.<sup>5</sup> To further complicate the proliferation issue, countries such as India, Argentina, and Brazil have obtained submarine production licensing agreements enabling local production and potential export opportunities.<sup>6</sup>

The former Soviet Union and now Russia have exported a highly capable variant of the diesel-electric *Kilo* class, most recently completing delivery of the second of three contracted *Kilos* to Iran. In October 1994, Pakistan successfully negotiated the purchase of three modern *Agosta* class diesel-electric submarines from France which will be armed with underwater launched *Exocet* anti-ship missiles.<sup>7</sup> The French commitment to sell a sub launched anti-ship missile will significantly enhance the striking capability of Pakistan's submarine force and that of any other country able to obtain such a weapons system. The German *Type-209* series has been by far the most widely exported diesel-electric submarine. Extremely reliable and capable of conducting extended patrols, various versions of the *Type-209* are

operated by over 13 navies.

Recent technological advances are dramatically enhancing the diesel-electric submarine's warfighting capabilities.

Historically, the diesel-electric submarine's most significant operational vulnerability is its need to snorkel to recharge its propulsion batteries. The recent development of advanced battery technology and air-independent propulsion systems will greatly decrease the requirement to snorkel, thereby limiting the opportunity for opposing forces to exploit snorkeling operations. Additionally, the availability of advanced weapons such as the Sub-Exocet, Russian made SS-N-25, UGM-84 Sub-Harpoon, and modern torpedoes will continue to enhance the diesel-electric submarine's striking potential.

In addition to continued platform and weapon systems improvements, the submarine's inherent capability to conduct mine laying, special forces insertion, and intelligence gathering operations exemplify adversarial submarine mission capabilities that operational planners will conceivably have to contend with.

The potential submarine threat to future U.S. naval operations in a littoral environment has increased significantly in recent years. It is crucial that operational planners appreciate and become familiar with the capabilities of Third World submarine forces and realistically consider the threat they pose when formulating plans involving the operation of maritime forces in areas where such a threat exists. Furthermore, continued proliferation of advanced submarine technology should

be closely monitored and evaluated.

### The Operational Significance

Conducting naval operations in the littoral environment as compared to operating on the high seas can be significantly more challenging in numerous ways. When considering the littoral ASW problem, operational planners must appreciate that:

(1) traditional ASW methods tend not to be as effective in a shallow water environment, (2) the area of operations is likely to be more predictable from the adversary's perspective since operations are to be conducted in support of a littoral objective, and (3) the degree of risk and acceptability of losing critical high value units must be carefully evaluated, especially in a limited conflict.

Having to contend with a shallow water diesel-electric threat will be very challenging to today's ASW platforms. The ability to predict acoustic conditions is crucial to conducting ASW operations. As compared to deep water, shallow water sound propagation can be very difficult to exploit. Dealing with high ambient noise levels, water temperature and salinity variation, and bottom reverberation are some of the environmental challenges that the Navy's ASW forces will have to contend with. Dedicated efforts are being undertaken by such organizations as the Naval Meteorology and Oceanography Command to better predict and exploit shallow water environmental conditions.<sup>8</sup> Nevertheless, operational planners must realize that conducting shallow water

ASW is uniquely challenging, and considering that today's ASW systems were primarily designed for deep water employment, ASW efforts may prove to be significantly less effective and more asset intensive in a shallow water environment.

As compared to open ocean fleet action, littoral operations involve employing forces in a much more predictable and possibly constrained geographic area. Combatant forces will likely be drawn into multi-threat coastal environments in order to provide force protection to sustainment and amphibious landing ships. The necessity of providing ASW protection to the aircraft carrier, amphibious landing ships, and sustainment ships while simultaneously defending against air, surface, and mine threats will be extremely asset intensive and could quite possibly exhaust force defence capabilities if not managed properly.

The bottom line is that the success of conducting naval operations against a hostile submarine threat in the littoral will rely on the ability to exploit a difficult oceanographic environment in a constrained area of operations. Additionally, the challenge of minimizing the submarine threat to mission essential units such as aircraft carriers, amphibious ships, and sustainment ships while simultaneously contending with other mission requirements must be fully appreciated.

#### **No Quick Fix**

The ancient Chinese military strategist Sun Tzu observed that the first order of business in dealing with an adversary is

to know him. Once you "know" him, you can train and equip yourself to defeat him. Hence, intelligence, tactics, and advanced ASW systems are absolutely essential in order to deal with a Third World submarine threat.

Acquiring both historical and real-time intelligence of a potentially hostile country's submarine force needs to be an ongoing process. A dedicated effort must be made to maximize all means of keeping abreast of the capabilities, readiness, and proficiency of those nations' submarine forces that might pose a future threat to U.S. interests. Armed with an awareness of a potential adversary's submarine force capability, operational staffs must identify early in a conflict submarine related essential elements of information in order to best evaluate options available to deal with the threat.

Additionally, the Navy must continue to emphasize shallow water ASW tactical development. A recent contributor to the *U.S. Naval Institute Proceedings* went as far as to suggest that the Navy procure a small diesel-electric submarine force to provide realistic training to ASW forces.<sup>9</sup> The potential benefits of such an "aggressor" submarine training squadron are obvious; however, the concept is realistically cost prohibitive as the Navy continues to downsize. Nevertheless, the author had the right idea. Training opportunities with diesel forces of friendly nations should be capitalized upon in order to increase proficiency and to validate new tactics of the Navy's ASW forces. Worth noting is the fact that conducting training in the shallow

water environment is just as important as training on diesel-electric platforms. Additionally, cross-decking of ASW specialists to diesel-electric submarines of friendly nations would provide unique and highly valuable training opportunities to gain insight into the tactical operations, capabilities, and limitations of the diesel-electric platform.

Finally, the Navy must continue to develop technologies to deal with the shallow water submarine threat. Even though modern diesel-electric submarines are not required to expose themselves on the surface as often as older generation submarines, there will continue to be the need to snorkel occasionally and the tendency for the submarine to expose its periscope to confirm the surface picture or to facilitate target identification and firing solutions. In an effort to capitalize on such physical exposures, the Navy should continue to improve airborne radar and optical detection systems. Additionally, promising new technologies such as laser detection systems and low frequency active sonars must be developed to enhance traditional ASW capabilities.

There is no easy fix in dealing with the shallow water submarine threat. Acquiring accurate intelligence, developing effective tactics, conducting realistic training, and pursuing new ASW technologies are a few of the steps the Navy should take in order to maximize the effectiveness of shallow water ASW operations.

### What Can We Do Today?

When faced with a shallow water submarine threat, operational planners must devise an ASW strategy that is best suited to the given circumstances. The fundamental operational ASW strategies available to select from include: (1) preemptive destruction of an adversary's submarines, (2) precursor ASW operations, and (3) operational area sea denial to opposing submarines.

By far the easiest place to attack a submarine is while it's pierside. Once a submarine leaves port, it becomes a stealthy weapons platform that is both difficult to locate and destroy. Time and situation permitting, preemptive use of special operations forces or tactical air against an adversary's submarines in port and related support facilities should be considered. Another option would be to station attack submarine forces outside an adversary's submarine bases or in the vicinity of navigational chokepoints in order to attack adversary submarines as they transit.

If unable to conduct preemptive operations against an adversary's submarine force, precursor ASW operations in the planned operating area should be conducted to minimize the submarine threat to forces deploying to the area of operations. Both long range maritime patrol aircraft, threat environment permitting, and attack submarines should be given as much time and leeway as possible to neutralize the adversary's deployed submarines or at least aggressively search the desired operating

area before naval forces arrive.

If forced to operate surface forces in an area where a submarine threat exists, maximum effort should be directed at maintaining local sea denial to enemy submarines. Continuous ASW operations, often asset intensive, will need to be conducted to minimize the risk of a successful submarine attack. The rules of engagement should allow engagement of submarine contacts evaluated as hostile as expeditiously as possible. Additionally, anti-submarine mining operations should be considered as a means of limiting opposing submarine access to friendly operating areas.

Operational planners must realize that aircraft carriers, amphibious ships, and sustainment ships will potentially be operational centers of gravity in a limited conflict and are therefore most likely to be the primary targets of a future adversary's submarine force. The Navy's ASW forces, if dedicated fully and aggressively to the ASW mission, are capable of conducting sustained ASW operations that can significantly decrease the threat of opposing force submarine operations.

### Conclusion

The U.S. Navy will undoubtedly one day deploy a task force to a littoral area of the world to conduct operations against an adversary that maintains a capable submarine force. It is crucial to the success of future naval operations that the operational commander and his staff understand the nature and



complexity of the submarine threat, its operational impact and what can be done to effectively counter its lethal striking capability.

Admiral Woodward, commander of the British battle group during the Falklands War, insightfully observed that:

There was the inescapable truth that the Argentinean commanders failed to realize that if they had hit *Hermes*, the British would have been finished.<sup>10</sup>

It would behoove today's operational commander to assume that tomorrow's adversary appreciates the significance of the Admiral's astute observation.

### Notes

1. Robert L. Scheina, "Where Were Those Argentine Subs?" *U.S. Naval Institute Proceedings*, March 1984, p. 118.

2. Scheina, p. 119.

3. James Fitzgerald and John Benedict, "There is a Sub Threat," *U.S. Naval Institute Proceedings*, August 1990, p. 63.

4. U.S. Navy Dept., . . . *From the Sea* (Washington: 1992), p.1.

5. Martin Douglas, "Submarines for the Third World," *Naval Forces*, no. 6, 1993, p. 21.

6. Andres de Lionis, "Anti-Submarine Warfare in the Third World," *Jane's Intelligence Review*, April 1994, p. 188.

7. Norman Friedman, "French Sell Submarines to Pakistan," *U.S. Naval Institute Proceedings*, December 1994, p. 92.

8. Michael J. Carron and others, "The Challenge of the Coastal Waters," *U.S. Naval Institute Proceedings*, December 1994, p. 81.

9. Wade H. Schmidt, "Top Torpedo," *U.S. Naval Institute Proceedings*, March 1993, pp. 130-131.

10. Sandy Woodward and Patrick Robinson. *One Hundred Days - The Memoirs of the Falklands Battle Group Commander* (Annapolis: Naval Institute Press, 1992), p. xviii.

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